

NISTTech

Imaging Instruments Enhancement by Stray-light Correction

Simple and fast image enhancement for radiologists and researchers

Description

Researchers at the National Institute of Standards and Technology (NIST) have designed a novel system to enhance digital image fidelity by removing unwanted stray light (ghost images, scattered light, etc) from electronic images resulting from cameras, medical scanners (MRI, CT, ...), telescopes and microscopes. By applying this stray-light correction technique, significant reductions in overall measurement uncertainties can be achieved in medical imaging, astronomy, remote sensing, radiometry, colorimetry, photometry and many other practical applications.

This technique uses a stray-light correction matrix that can correct stray-light errors in any types of images by one matrix multiplication. Errors introduced in imaging systems by stray light can be reduced more than one orders of magnitude through the use of this simple, matrix-based correction method. The stray-light correction matrix and the correction algorithm can be implemented within the software of imaging instruments to perform real-time or fast corrections.

Images



Credit: NIST

Advantages

- **Quick quality improvement**
Rapidly corrects stray-light errors in array detectors and other imaging instruments by more than one order of magnitude
- **Wide pixel variation**
Capable of correcting stray-light errors in imaging instruments with large numbers of pixels
- **Corrects other errors**
Stray-light correction eliminates other types of errors such as detector cross-talk, read-out smearing, and detector window reflection
- **Adaptable and Precise**
Technique can be used in many fields while measurement uncertainty can still be reduced significantly

Abstract

This method uses stray light correction matrix derived from point spread functions (PSF) of an instrument. The correction of stray light errors is simply a matrix multiplication to the measured raw image. The correction is fast and can be used for correction of stray light errors in any types of measured images.

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Citations

1. 1.) Y. Zong, S. W. Brown, B. C. Johnson, K. R. Lykke, and Y. Ohno, "Simple spectral stray light correction method for array spectroradiometers," *Applied Optics*, Vol. 45, No.6 (2006).

2.) Y. Zong, S. W. Brown, B. C. Johnson, K. R. Lykke, and Y. Ohno, "Correction of stray light in spectrographs: implications for remote sensing," *Proc. Of SPIE*, Vol. 5882 Earth Observing Systems X (2005), pp 588201-1 to 588201-8.
2. Article: New NIST Method Improves Accuracy of Spectrometers

Related Items

- MERWYN Business Simulation Report

References

- U.S. Patent Application # 20090059210
- Docket: 07-021

Status of Availability

This invention is available for licensing.

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